2. Stand Enhancement (Interseeding)

Stand enhancement techniques are often applied to sites that are dominated by grasses with few to no prairie forbs. Stand enhancement adds native grasses and forbs without eliminating the established vegetation.

Option 1: Direct Interseeding

Seed is sown into the established vegetation without disrupting the established vegetation. Prairie plant establishment can be low in stands of grasses and forbs without eliminating the establishment with seeding equipment. To request copies, or for more information, call the Tallgrass Prairie Center at 319.273.3836.

Option 2: Repeated Mowing and Interseeding

- Remove standing dead material and thatch by prescribed burning in fall or by late summer haying.
- Seed in fall or in early spring with a no-till drill.
- Mow from late April to early September, four times during the growing season.
- If the screwdriver cannot be pushed more than 2 inches into the soil in at least half of the spots, there is a good chance that the soil surface is too compacted. To eliminate surface compaction, rototill the site to loosen the upper 4 inches of soil. Any large (greater than ½ inch) dirt clods need to be broken into smaller pieces. To reduce clod size, harrow the site using a drag harrow or a piece of chain link fence with some weight added.

Removing Trees and Shrubs

The species composition of a planted prairie will change over time if volunteer trees and shrubs are not eliminated. Shade from trees and shrubs will create cooler and moister conditions under the canopy, favoring shade-tolerant plant species and displacing full-sunlight prairie species. In addition, woody plants that are left on the site will spread by suckering and seed, further displacing prairie plants. Woody plants can also interfere with no-till drilling and broadcast seeding of the natives.

Some practitioners leave a few clone groups of native trees like wild plum and chokecherry on the site for habitat. However, native trees and shrubs like boxelder (Acer negundo), red cedar (Juniperus virginiana), and gray dogwood (Cornus florida) should be removed because they can aggressively spread in a planted prairie (Table 1). We recommend the removal of all non-native trees and shrubs.

Herbicides are very effective at killing woody plants. Smaller trees and shrubs can be follar-sprayed. Trees greater than ½-inch diameter need to be cut and the stump chemically treated to prevent resprouting (Table 1). Herbicide should only be applied to the inner bark (cambium layer) of the cut surface. The inner bark region of the cut stump is a thin layer adjacent to the outer bark of the tree. Because of the high concentration of chemical in stump-treatment herbicides, it is important to be careful not to dribble herbicide off the cut surface onto the ground. Coniferous trees (pines and cedars) do not need to be treated after being cut because they will not re-sprout, but all deciduous trees will need to be treated. Stumps need to be cut flat and as close to the ground as possible to prevent interference with seeding equipment.

Site Preparation Altering the existing vegetation and soil structure in advance of seeding, increasing emergence, growth and survivorship of the seeded natives by removing thatch, improving seed to soil contact, and reducing weeds. From construction sites to cornfields, site conditions can be drastically different and require specific site preparation techniques. There are two broad categories of site preparation: one associated with bare soil sites, and one with vegetated sites.

Caution - most of the site preparation methods described in this publication involve killing the existing vegetation and should NOT be used if remnant prairie vegetation (prairie plants that were not planted) are present at the site. Restoration techniques should be applied if remnant prairie plants are present.

To request copies, or for more information, call the Tallgrass Prairie Center at 319.273.3836.

Table 1. Persistent Perennial Plants

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Genus-specific</th>
<th>Phenology</th>
<th>Herbicide Method*</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kentucky bluegrass</td>
<td>Poa pratensis</td>
<td>green</td>
<td>glyphosate, trifluralin</td>
<td>cut stump</td>
</tr>
<tr>
<td>tallgrass</td>
<td>Agropyron repens</td>
<td>green</td>
<td>glyphosate, trifluralin</td>
<td>cut stump</td>
</tr>
<tr>
<td>smooth brome</td>
<td>Bromus inermis</td>
<td>green</td>
<td>glyphosate, trifluralin</td>
<td>cut stump</td>
</tr>
<tr>
<td>tall fescue</td>
<td>Festuca arundinacea</td>
<td>green</td>
<td>glyphosate, trifluralin</td>
<td>cut stump</td>
</tr>
<tr>
<td>bird’s-foot trefoil</td>
<td>Lotus corniculatus</td>
<td>hardseeded</td>
<td>bensulide, acifluorfen, flumioxazin</td>
<td>cut stump</td>
</tr>
<tr>
<td>Canada thistle</td>
<td>Cirsium arvense</td>
<td>hardseeded</td>
<td>flumioxazin, glyphosate, metsulfuron</td>
<td>cut stump</td>
</tr>
<tr>
<td>crown vetch</td>
<td>Coronilla varia</td>
<td>hardseeded</td>
<td>trifluralin, glyphosate, metsulfuron</td>
<td>cut stump</td>
</tr>
<tr>
<td>leafy spurge</td>
<td>Euphorbia esula</td>
<td>hardseeded</td>
<td>propamocarb, trifluralin</td>
<td>cut stump</td>
</tr>
<tr>
<td>black locust</td>
<td>Robinia pseudoacacia</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>box elder</td>
<td>Acer negundo</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>common buckthorn</td>
<td>Fraxinus americana</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>gray dogwood</td>
<td>Cornus racemosa</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>green ash</td>
<td>Fraxinus pennsylvanica</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>honey locust</td>
<td>Gleditsia triacanthos</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>multiflora rose</td>
<td>Rosa multiflora</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>red cedar</td>
<td>Juniperus virginiana</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>Siberian elm</td>
<td>Ulmus pumila</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>silver maple</td>
<td>Acer saccharum</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>smooth sumac</td>
<td>Rhus glabra</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
<tr>
<td>tartarian honeysuckle</td>
<td>Lonicera tatarica</td>
<td>woody</td>
<td>glyphosate, picloram</td>
<td>cut stump, or basal</td>
</tr>
</tbody>
</table>

* Always read and follow label directions.

Funded By

University of Northern Iowa
**Site Preparation For “Bare Soil” Sites**

**Construction Sites**

In many construction sites, the original soil profile has been altered during the construction process. Some areas within the site may have compacted soil from construction equipment (see Assessing for Soil Compaction). Many construction sites have large clods and compacted soil. An ideal seedbed for a native seeding should consist of friable soil particles (1/2 inch or smaller) in the top 1 inch of the soil.

- **Cultipack the site** before seeding if a no-till seed drill is used. Cultipack the site after seeding if the site is seeded with a drop seeder.
- **Rototill or shallow disk (4-inch depth)** prior to seeding for compacted soil or if clods are greater than 1/2 inch.
- **Seed in fall or in early spring.**
- **Cutpacking after seeding improves seed-to-soil contact.**

**Row-Cropped Sites**

Sites that have been row-cropped may require different kinds of site preparation. The amount of site preparation needed depends upon the quantity of crop residue (see Assessing Crop Residue section) left on the field and the kind of equipment available to conduct site preparation activities.

- **Cultipack the site** before seeding if a no-till seed drill is used.
- **Sprite a prairie remnant and site preparation techniques for prairie remnants should be used.**
- **Second disking pass.**
- **Third disking pass.**

**Light Crop Residue**

- **No other site preparation needed if seeded with a no-till drill.**
- **If broadcast or drop seeding, first cultivate with a spiked toothed harrow to roughen the soil surface.**
- **Seed in fall or in early spring.**
- **Cutpacking after seeding improves seed-to-soil contact.**

**Heavy Crop Residue**

- **Mow (chop) stalks if standing.**
- **Remove crop residue by baling or by disk/cultivating the planting site to mimic a seedbed needed for a corn or soybean planting.**
- **Seeding can be done in fall or in spring after removing crop residue.**
- **Cutpacking after seeding improves seed-to-soil contact.**

**Field examples of light crop residue not needing any tillage prior to seeding natives with a no-till grass drill.**

**Feedlots, Overgrazed Pastures**

Bare soil can result from severe overgrazing and livestock trampling. By removing livestock from the site, vegetation can re-emerge from underground rootstock. Livestock should be removed for at least one entire growing season to allow the vegetation to recover and be identified. If remnant (not planted) prairie plants are detected, the site should be considered a prairie remnant and site preparation techniques for prairie remnants should be used. Typically, feedlots and overgrazed pastures will contain persistent perennial plants and high levels of weed seed in the soil. Manure can also contribute to high levels of nitrogen in the soil, which will stimulate weed germination and weed growth. If no remnant prairie plants are detected, use site preparation techniques from the Stand Replacement subsection of this publication.

**Site Preparation For “Vegetated” Sites**

Types of vegetated sites include: turf grass lawns, pastures, hayfields, and conservation plantings. Vegetation on these sites can vary from smooth brome/alalfa hayfields and Kentucky bluegrass lawns to a dense stand of Prairie grasses on a site enrolled in a federal government Conservation Reserve Program (CRP). Caution - if a site contains remnant (not planted) prairie plants, the site should be considered a prairie remnant and site preparation techniques for prairie remnants should be used.

There are two site preparation options - stand replacement (starting over) and stand enhancement (interseeding). Stand replacement site preparation techniques should be used to replace a current stand of non-native grasses and legumes with prairie grasses and wildflowers. Stand enhancement site preparation techniques are typically used when the goal is to add additional prairie species to sites that currently have some native plants or are dense stands of prairie and pasture grasses with few to no wildflowers.

1. **Stand Replacement (Starting Over)**

Stand replacement has three primary methods of site preparation. Select a site preparation technique based upon the speed in which you want to complete the project, the budget for the project, and the kind of equipment available to conduct site preparation activities.

**Option 1: Spray and Plant**

- **Mow (4 inches high or less)** in spring or in late summer or burn when the vegetation is dormant.
- **Apply an appropriate herbicide(s) to actively growing vegetation when there is 4 to 6 inches of new growth.** For legume/grass stands, a mixture of a broadleaf and grass herbicide, such as glyphosate and 2, 4-D should be used. It can take 2 to 4 weeks after mowing or burning for the vegetation to have enough new growth for a herbicide treatment. Re-spray any green plants after 14 days from the first herbicide treatment. Wait another 14 days after the last herbicide treatment to seed. Seed can then be broadcasted or drilled.

**Option 3: Spray, Till and Plant**

This method controls established persistent perennial plants and germinating weed seed in the soil. Caution - this option is not recommended for erosive sites as repeated disking will create bare soil.

- **Mow (4 inches high or less)** or prescribe burn in early spring.
- **Apply glyphosate to actively growing vegetation when there is 4 to 6 inches of new growth.**
- **Wait 10 days after the herbicide application and disk the site at 3-4 week intervals for the entire growing season.**
- **Seed in fall or in early spring.**
- **Cutpacking after seeding improves seed-to-soil contact.**

**Assessing Crop Residue**

Crop residue can be grouped into two categories - light or heavy. Light crop residue is defined as crop stubble no more than 4 inches high with residue on the surface not intertwined and some bare soil that can be seen through the residue. Light crop residue can include soybean residue, corn residue after a silage harvest, corn residue after burning, or cereal grain residue. Heavy crop residue is defined as crop stubble taller than 6 inches, intertwined and layered on the surface, with no bare soil visible. Heavy crop residue includes: corn or sorghum residue after a typical harvest and some cereal grains such as winter wheat.

Assessing crop residue in the field must be done onsite. Walk in a line across the field and stop in ten spots of equal distance from end to end. Look down near your foot to see if bare soil is visible. Reach down and grab some residue; it is intertwined if a layer of residue larger than your hand comes off the ground. If intertwined residue is found and bare soil cannot be seen in more than five spots, consider the crop residue to be heavy.